

What we claim is:

1. A cholesteric liquid crystal polarizing device comprising:
a substrate;
an alignment layer; and
a cholesteric liquid crystal layer including multiple domains, each of said domains skewed at an angle relative to a plane parallel to said substrate.
2. The cholesteric liquid crystal polarizing device of claim 1 wherein said multiple domains are skewed at a substantially uniform angle.
3. The cholesteric liquid crystal polarizing device of claim 2 wherein at least one of said multiple domains includes a plurality of sub-domains, said sub-domains being disposed within a distribution of angles relative to said at least one domain.
4. The cholesteric liquid crystal polarizing device of claim 1 wherein said multiple domains are skewed at a distribution of angles.
5. The cholesteric liquid crystal polarizing device of claim 1 further comprising a plurality of pixel regions.
6. The cholesteric liquid crystal polarizing device of claim 1 wherein said pixel regions are arranged in a repeating array of red pixels, green pixels and blue pixels, said red pixels reflecting circularly polarized red light, said green pixels reflecting circularly polarized green light and said blue pixels reflecting circularly polarized blue light.
7. The cholesteric liquid crystal polarizing device of claim 1 wherein said angle is in the range from about 2 to about 10 degrees.
8. The cholesteric liquid crystal polarizing device of claim 1 wherein said angle is in the range from about 4 to about 6 degrees.

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9. The cholesteric liquid crystal polarizing device of claim 1 wherein said multiple domains are produced by embossing a relief structure on a surface of said cholesteric liquid crystal polarizing device.

10. The cholesteric liquid crystal polarizing device of claim 1 wherein said embossing comprises laminating a stretched polyester material into the surface of a cholesteric liquid crystal polarizing layer.

11. The cholesteric liquid crystal polarizing device of claim 1 wherein said substrate comprises glass.

12. The cholesteric liquid crystal polarizing device of claim 1 wherein said alignment layer comprises polyimide.

13. A liquid crystal display including the cholesteric liquid crystal polarizing device of claim 1.

14. The cholesteric liquid crystal polarizing device of claim 1 comprising a monochromatic device.

15. A reflective liquid crystal display comprising:
a planar cholesteric liquid crystal polarizing device, including multiple domains, each of said domains skewed at an angle relative to a plane parallel to said cholesteric liquid crystal polarizing device;
a liquid crystal cell; and
an internal quarter-wave retarder;
said cholesteric liquid crystal polarizing device, said liquid crystal cell, and said quarter wave retarder being superposed with one another.

16. The reflective liquid crystal display of claim 15 wherein said multiple domains are skewed at a substantially uniform angle.

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17. The cholesteric liquid crystal polarizing device of claim 16 wherein at least one of said multiple domains includes a plurality of sub-domains, said sub-domains being disposed within a distribution of angles relative to said at least one domain.

18. The cholesteric liquid crystal polarizing device of claim 15 wherein said multiple domains are skewed at a distribution of angles.

19. The reflective liquid crystal display of claim 15 wherein said reflective liquid crystal display includes a normally white mode device.

20. The reflective liquid crystal display of claim 15 wherein said reflective liquid crystal display includes a normally black mode device.

21. The reflective liquid crystal display of claim 15 wherein said liquid crystal cell is disposed adjacent to a thin film transistor array having a plurality of pixel regions.

22. The reflective liquid crystal display of claim 15 wherein said cholesteric liquid crystal polarizing device further comprises a plurality of pixel regions.

23. The reflective liquid crystal display of claim 22 wherein said pixel regions are arranged in a repeating array of red pixels, green pixels and blue pixels, said red pixels reflecting circularly polarized red light, said green pixels reflecting circularly polarized green light and said blue pixels reflecting circularly polarized blue light.

24. The reflective liquid crystal display of claim 15 wherein:
said liquid crystal cell is disposed adjacent to a thin film transistor array having a plurality of pixel regions;
said cholesteric liquid crystal polarizing device comprises a plurality of pixel regions; and
said plurality of pixel regions of said thin film transistor array are in registration with said plurality of pixel regions of said cholesteric liquid crystal polarizing device.

25. The reflective liquid crystal display of claim 15 wherein said angle is in the range from about 2 to about 10 degrees.

26. The reflective liquid crystal display of claim 25 wherein said angle is in the range from about 4 to about 6 degrees.

27. The reflective liquid crystal display of claim 15 wherein said multiple domains are produced by embossing a relief structure on a surface of said cholesteric liquid crystal polarizing device.

28. The reflective liquid crystal display of claim 15, wherein said liquid crystal cell comprises a 90° twisted nematic liquid crystal.

29. The reflective liquid crystal display of claim 15 further comprising a linear polarizer and an absorbing medium.

30. A reflective liquid crystal display comprising:
a linear polarizer, said linear polarizer having a polarization direction;
a liquid crystal cell;
a quarter-wave retarder, said quarter-wave retarder having a fast axis;
a planar cholesteric liquid crystal polarizing device;
said cholesteric liquid crystal polarizing device including a plurality of pixel regions;
said cholesteric liquid crystal polarizing device including multiple domains, each of said domains skewed at an angle relative to a plane parallel to said cholesteric liquid crystal polarizing device; and
an absorbing medium.

31. The reflective liquid crystal display of claim 30 wherein said liquid crystal cell is disposed adjacent to a thin film transistor array having a plurality of pixel regions.

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32. The reflective liquid crystal display of claim 31 wherein said plurality of pixel regions of said thin film transistor array are in registration with said plurality of pixel regions of said cholesteric liquid crystal polarizing device.

33. The reflective liquid crystal display of claim 30 wherein said liquid crystal cell comprises a 90° twisted nematic liquid crystal.

34. The reflective liquid crystal display of claim 30, said reflective liquid crystal display being a normally white mode device, wherein
said fast axis of said quarter-wave retarder is oriented at -45° to said polarization direction of said linear polarizer; and
said cholesteric liquid crystal polarizing device reflects substantially pure left-hand circularly polarized light.

35. The reflective liquid crystal display of claim 30, said reflective liquid crystal display being a normally black mode device, wherein
said fast axis of said quarter-wave retarder is oriented at +45° to said polarization direction of said linear polarizer; and
said cholesteric liquid crystal polarizing device reflects substantially pure left-hand circularly polarized light.

36. The reflective liquid crystal display of claim 30, said reflective liquid crystal display being a normally white mode device, wherein
said fast axis of said quarter-wave retarder is oriented at +45° to said polarization direction of said linear polarizer; and
said cholesteric liquid crystal polarizing device reflects substantially pure right-hand circularly polarized light.

37. The reflective liquid crystal display of claim 30, said reflective liquid crystal display being a normally black mode device, wherein
said fast axis of said quarter-wave retarder is oriented at -45° to said polarization direction of said linear polarizer; and

said cholesteric liquid crystal polarizing device reflects substantially pure right-hand circularly polarized light.

38. A method for fabricating a reflective liquid crystal display, said method comprising:

providing a liquid crystal cell disposed adjacent to a thin film transistor array having a plurality of pixel regions;

superposing said liquid crystal cell with a planar cholesteric liquid crystal polarizing device; and

providing said cholesteric liquid crystal polarizing device with multiple domains, each of said domains skewed at an angle relative to a plane parallel to said cholesteric liquid crystal polarizing device.

39. The method of claim 38 further comprising:

providing said cholesteric liquid crystal polarizing device with a plurality of pixel regions,

arranging said pixel regions in a repeating array of red pixels, green pixels and blue pixels, said red pixels reflecting circularly polarized red light, said green pixels reflecting circularly polarized green light and said blue pixels reflecting circularly polarized blue light.

40. The method of claim 38 further comprising:

aligning said pixel regions of said cholesteric liquid crystal polarizing device with said pixel regions of said thin film transistor array to register them with one another.

41. The method of claim 38 further comprising:

superposing said cholesteric liquid crystal polarizing device and said liquid crystal cell with a linear polarizer, a quarter-wave retarder and an absorbing medium.

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